

IN THE CLAIMS:

Please cancel claim 5 in its entirety without prejudice nor disclaimer of the subject matter set forth therein.

Please amend claims 6-~~18~~¹⁷ as follows.

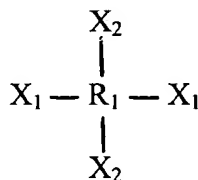
6. (Amended) The method for forming a semiconductor device of Claim 18, wherein the first cross-linking molecules are first organic molecules having three or more sets of functional groups in one molecule,

the second cross-linking molecules are second organic molecules having two sets of functional groups in one molecule, and

the three-dimensionally polymerized polymer is formed by 10 binding the three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each of the second organic molecules together.

7. (Amended) The method for forming a semiconductor device film of Claim 6, wherein

the first organic molecules are represented by
[chemical formula 1]



(where R₁ is a first organic skeleton, X₁ is a first set of functional groups, and X₂ is a second set of functional groups, X₁ and X₂ being same or different in type),

the second organic molecules are represented by
[chemical formula 2]



(where R_2 is a second organic skeleton, Y_1 is a third set of functional groups, and Y_2 is a fourth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by binding the first set of functional groups (X_1) and the third set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fourth set of functional groups (Y_2) together, and

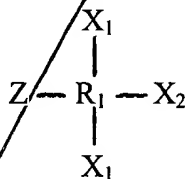
the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2).

8. (Amended) The method for forming a semiconductor device of Claim 6,

wherein

the first organic molecules are represented by

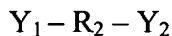
[chemical formula 3]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, X_2 is a second set of functional groups, and Z is a third set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 4]



(where R_2 is a second organic skeleton, Y_1 is a fourth set of functional groups, and Y_2 is a fifth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by first binding the first set of functional groups (X_1) and the fourth set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fifth set of functional groups (Y_2) together to form a plurality of units and then binding the third set of functional groups (Z) of the plurality of units together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2) in the plurality of units.

9. (Amended) The method for forming a semiconductor device of Claim 18, further comprising the steps of:

B' cont
forming an interlayer dielectric film comprising a three-dimensionally polymerized polymer having a number of molecular level pores inside, by polymerizing first cross-linking molecules having a three-dimensional structure and second cross-linking molecules having a two-dimensional structure;

C1 cont
forming a surface barrier film on the interlayer dielectric film;

forming a mask on the surface barrier film;

forming a concave portion in the surface barrier film and the interlayer dielectric film by etching the surface barrier film and the interlayer dielectric film using the mask; and

forming an interconnection made of a metal material by filling the concave portion with the metal material.

10. (Amended) The method for forming a semiconductor device of Claim 9, wherein the first cross-linking molecules are first organic molecules having three or more sets of functional groups in one molecule,

✓ the second cross-linking molecules are second organic molecules having

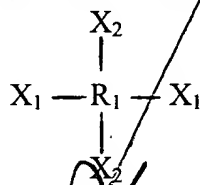
two sets of functional groups in one molecule, and

the three-dimensionally polymerized polymer is formed by binding the three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each the second organic molecules together.

11. (Amended) The method for forming a semiconductor device of Claim 10, wherein

the first organic molecules are represented by

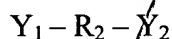
[chemical formula 1]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, and X_2 is a second set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 2]



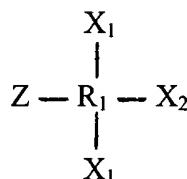
(where R_2 is a second organic skeleton, Y_1 is a third set of functional groups, and Y_2 is a fourth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by binding the first set of functional groups (X_1) and the third set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fourth set of functional groups (Y_2) together, and the molecular level pores are formed in region surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2).

12. (Amended) The method for forming a semiconductor device of Claim 10, wherein

the first organic molecules are represented by

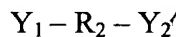
[chemical formula 3]



(where R_1 is a first organic skeleton, X_1 is a first set of functional groups, X_2 is a second set of functional groups, and Z is a third set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 4]



(where R_2 is a second organic skeleton, Y_1 is a fourth set of functional groups, and Y_2 is a fifth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by first binding the first set of functional groups (X_1) and the fourth set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fifth set of functional groups (Y_2) together to form a plurality of units and then binding the third set of functional groups (Z) of the plurality of units together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_2) in the plurality of units.

13. (Amended) The method for forming a semiconductor device of Claim 18,

further comprising the steps of:

C1
Conc
forming an interlayer dielectric film comprising a three-dimensionally polymerized polymer having a number of molecular level pores inside, by polymerizing first cross linking molecules having a three-dimensional structure and second cross-linking molecules having a two-dimensional structure;

forming a mask on the interlayer dielectric film;

forming a concave portion in the interlayer dielectric film by etching the interlayer dielectric film using the mask;

B
lost
forming a sidewall barrier film on sidewalls of the concave portion; and

forming an interconnection made of a metal material by filling the concave portion having the sidewall barrier film with the metal material.

14. (Amended) The method for a semiconductor device of Claim 13, further comprising the step of forming a surface barrier film on the a semiconductor device between the step of forming an interlayer dielectric film and the step of forming a mask,

wherein the step of forming an concave portion comprises the step of forming a concave portion in the surface barrier layer and the interlayer dielectric film by etching the surface barrier film and the interlayer dielectric film using the mask.

15. (Amended) The method for forming a semiconductor device of Claim 13, wherein the first cross-linking molecules are first organic molecules having three or more sets of functional groups of one molecules,

the second cross-linking molecules are second organic molecules having two sets of functional groups in one molecules, and

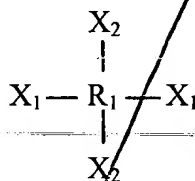
the three-dimensionally polymerized polymer is formed by binding the

three or more sets of functional groups of each of the first organic molecules and the two sets of functional groups of each of the second organic molecules together.

16. (Amended) The method for forming a semiconductor device of Claim 15, wherein

the first organic molecules are represented by

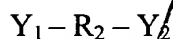
[chemical formula 1]



B' unit
(wherein R_1 is a first organic skeleton, X_1 is a first set of functional groups, and X_2 is a second set of functional groups, X_1 and X_2 being same or different in type),

the second organic molecules are represented by

[chemical formula 2]



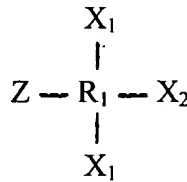
(where R_2 is a second organic skeleton, Y_1 is a third set of functional groups, and Y_2 is a fourth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by binding the first set of functional groups (X_1) and the third set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fourth set of functional groups (Y_2) together, and

the molecular level pores are formed in region surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2).

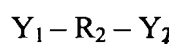
17. (Amended) The method for forming a semiconductor device of Claim 15, wherein

the first organic molecules are represented by
[chemical formula 3]



(wherein R_1 is a first organic skeleton, X_1 is a first set of functional groups, X_2 is a second set of functional groups, and Z is a third set of functional groups, X_1 and X_2 being same or different in type),

B₁ Incl
the second organic molecules are represented by



(where R_2 is a second organic skeleton, Y_1 is a fourth set of functional groups, and Y_2 is a fifth set of functional groups, Y_1 and Y_2 being same or different in type),

the three-dimensionally polymerized polymer is formed by first binding the first set of functional groups (X_1) and the fourth set of functional groups (Y_1) together and binding the second set of functional groups (X_2) and the fifth set of functional groups (Y_2) together to form a plurality of units and then binding the third set of functional groups (Z) of the plurality of units together, and

the molecular level pores are formed in regions surrounded by the first organic skeletons (R_1) and the second organic skeletons (R_2) in the plurality of units.

Please add new claim 18 as follows.

18. (New) A method for forming a semiconductor device, comprising the steps of:
polymerizing first cross-linking molecules having a three-dimension structure and second cross-linking molecules having a two-dimensional structure to form an
- B₂
Poly
C₁*

Chloro-
poly-
vinyl

interlayer dielectric film composing a three-dimensionally polymerized polymer having a number of molecular level pores.
